The Future of NWS Hydrologic Services

Meeting America's Water Resource Information Needs

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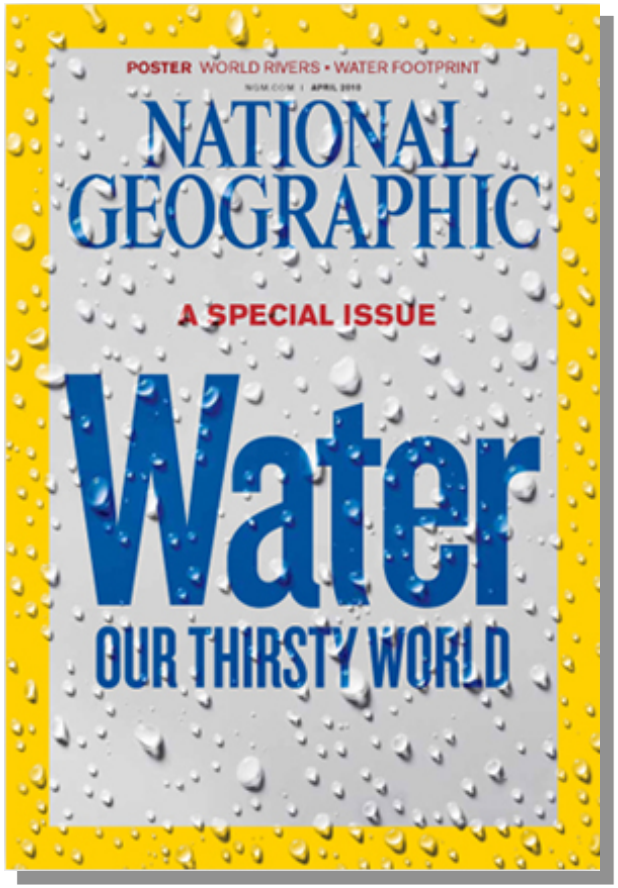
2010 – Montana Hydrology Workshop

The Global Water Imperative



Protect Life and Property	• **Floods and droughts cause more U.S. economic losses than any other type of natural disaster**
Support Economic Security	• **Water has always been a critical component in the success of any economic endeavor**
Protect Health and Environment	• **Water is the lifeblood of this planet**
Mitigate Escalating Risk	• **Triple Threat: Scarcity and floods, climate change, and aging infrastructure**

"Nearly half of the streams and lakes in the U.S. are not clean enough to sustain swimming and fishing and our infrastructure has been given a D grade"

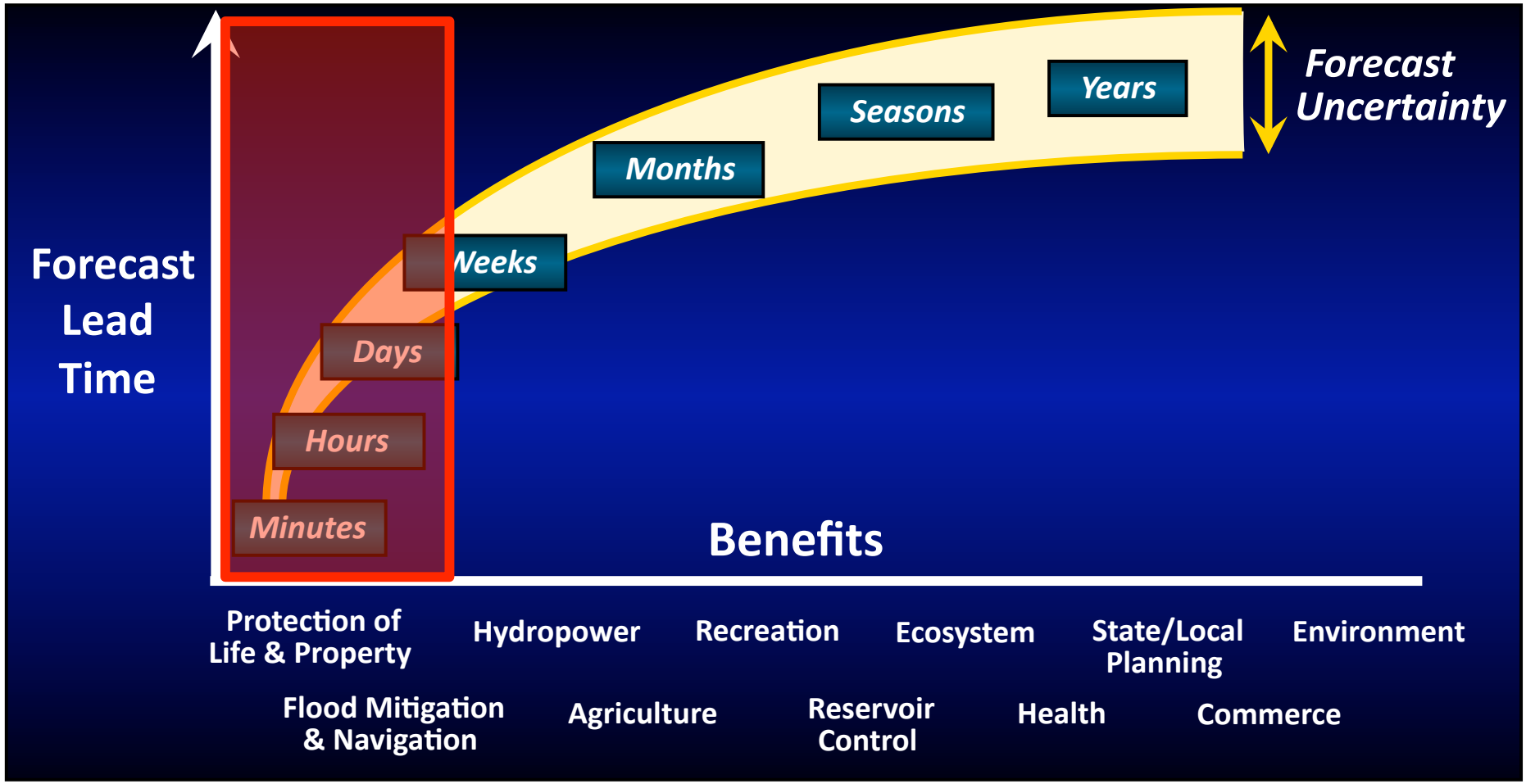
Water Issues:
Too Much, Too Little, Poor Quality





- **New strategic plans for NOAA and NWS recognize decision-makers in all water management sectors need:**
  - Higher resolution information in space and time
  - Quantification of uncertainty to manage risk
- **Water resource challenges are significant and getting bigger:**
  - Population growth and economic development are stressing water supplies and increasing vulnerability
  - A changing climate is impacting water availability and quality
  - Socio-economic risks of floods and droughts are escalating
- **Growing needs for water resource forecasts:**
  - Soil moisture for agriculture and forest management
  - Low flow for maintaining water supply
  - Water temperature and salinity forecasts for fisheries management and healthy ecosystems

Water Forecasting Challenges



Collaborating for a Sustainable Water Future

- National stakeholder needs assessment included 50 states and 12 Federal agencies (2009)
- Revealed broad need for a Federal Tool Box for water resources

12 Assessment Agencies:

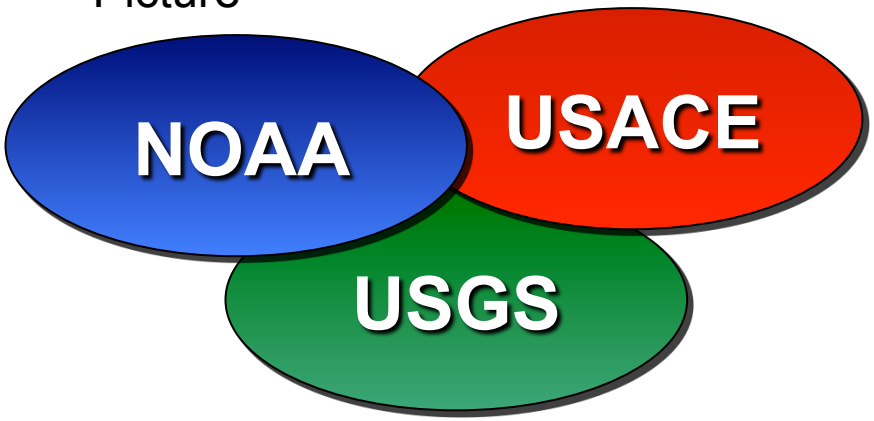
- **National Oceanic and Atmospheric Administration**
- U.S. Forest Service
- Natural Resources Conservation Service
- Army Corps of Engineers
- Environmental Protection Agency
- Federal Emergency Management Agency
- Bureau of Land Management
- Bureau of Reclamation
- Fish and Wildlife Service
- National Park Service
- U.S. Geological Survey
- Tennessee Valley Authority

Primary Roles:

- **Prediction**
- Monitoring
- Science
- Management
- Conservation
- Regulation
- Protection
- Mitigation
- Restoration
- Response
- Recovery

Integrated Water Resources Science and Services Partnering & Leveraging

- NOAA is leading the multi-agency IWRSS consortium to:
  - Prototype the Federal Tool Box for water resources
  - Streamline access to Federal water resource capabilities
  - Share technology, information, models, best practices
  - Develop interoperable tools
  - Create a Common Operating Picture



Community Hydrologic Prediction System

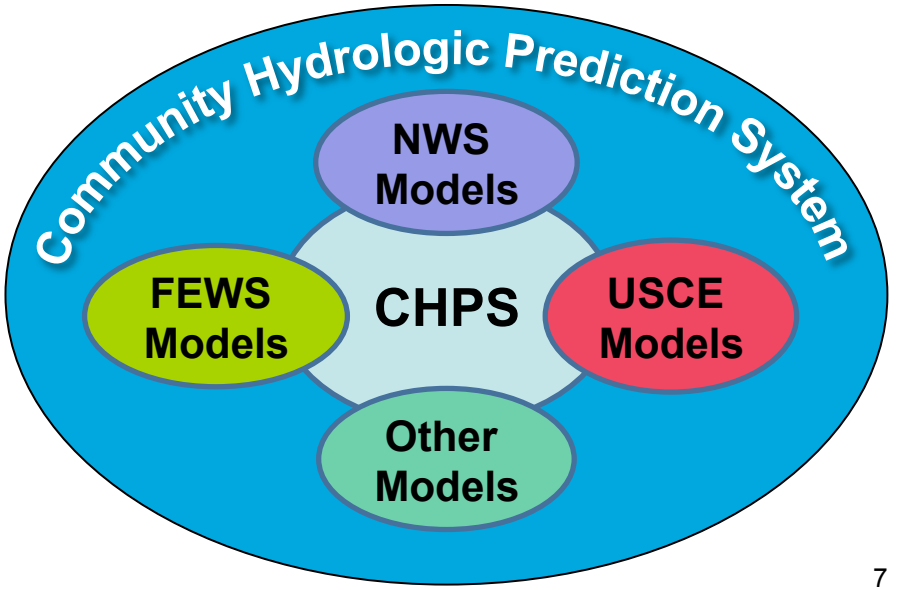
Flexible, open modeling architecture *linking* program elements

- Modular software to enhance collaboration and accelerate R2O
- Extension of the Flood Early Warning System (FEWS) architecture:
  - Incorporates NWS models with models from other Water Agencies, Corps of Engineers, USGS, and Academia

Implementation Status:

✓ Conducting parallel operations by early 2011

✓ Retire legacy system in early 2012



Integrated Water Forecasting Program
No Longer Just River/High Waters

NOAA's Role: Provide accurate and reliable water forecasts (*where, when, and how much*)

Rivers and Floods	Coasts, Lakes and Estuaries	Water Resources
Advanced Hydrologic Prediction Service •Traditional Focus	**Coast, Estuary, River Information Services** •New Focus	**Integrated Water Resources Science and Services**

Community Hydrologic Prediction System (CHPS)

Objective 1
Reduce 1-7 day river forecast errors and quantify uncertainty

Objective 3
Couple modeling systems for rivers, lakes and estuaries

Objective 4
Deliver seamless, high resolution water quantity and quality forecasts

Objective 2
Provide flood inundation forecast maps for high-impact communities

Objective 5
Advance and integrate observing systems to improve QPE and QPF

Forecast Product Evolution

•1993

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HYDROLOGIC SUMMARY
NATIONAL WEATHER SERVICE DES MOINES IA
137 PM CDT THU JUN 12 2008

HOURLY RIVER STAGES

                                                  CUR     6HR OBS
LOCATION                  ID      BF      FS      STG     CHG TIME(LCL)
-------------------------------------------------------------------

BOONE RIVER
 WEBSTER CITY             WBCI4    9.0    12.0    14.15   -0.23  13:00

EAST FORK DES MOINES RIVER
 ALGONA                   AGNI4   12.0    14.0    18.25    0.63  13:00
 DAKOTA CITY              DAKI4    0.0    20.0    16.43    0.04  13:00

WEST FORK DES MOINES RIVER
 ESTHERVILLE              ESVI4    6.0     7.0     8.13    0.04  13:00
 EMMETSBURG               EMTI4   10.0    10.0     8.23    0.28  13:00
 HUMBOLDT                 HBTI4    0.0     8.0     9.07   -0.09  13:15

DES MOINES RIVER
 FORT DODGE               FODI4    0.0    10.0    10.70   -0.17  13:00
 STRATFORD                STRI4   14.0    14.0    23.08   -0.27  13:00
 SAYLORVILLE TAIL         SDTI4    0.0     M       M       M     M
 2ND AVE DES MOINES       DMOI4    0.0    23.0    29.37    0.38  13:00
 DES MOINES SE 6TH        DESI4    0.0    24.0    33.29    0.34  13:00
 TRACY                    TRCI4   13.0    14.0    19.85    1.42  13:00
 OTTUMWA                  OTMI4    8.0    10.0    12.96    0.58  13:00
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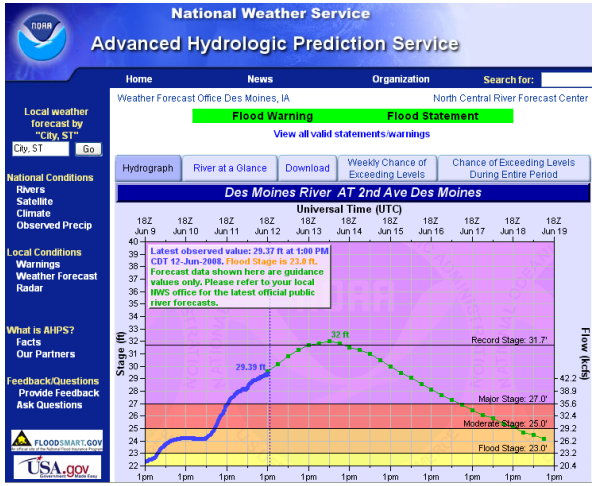
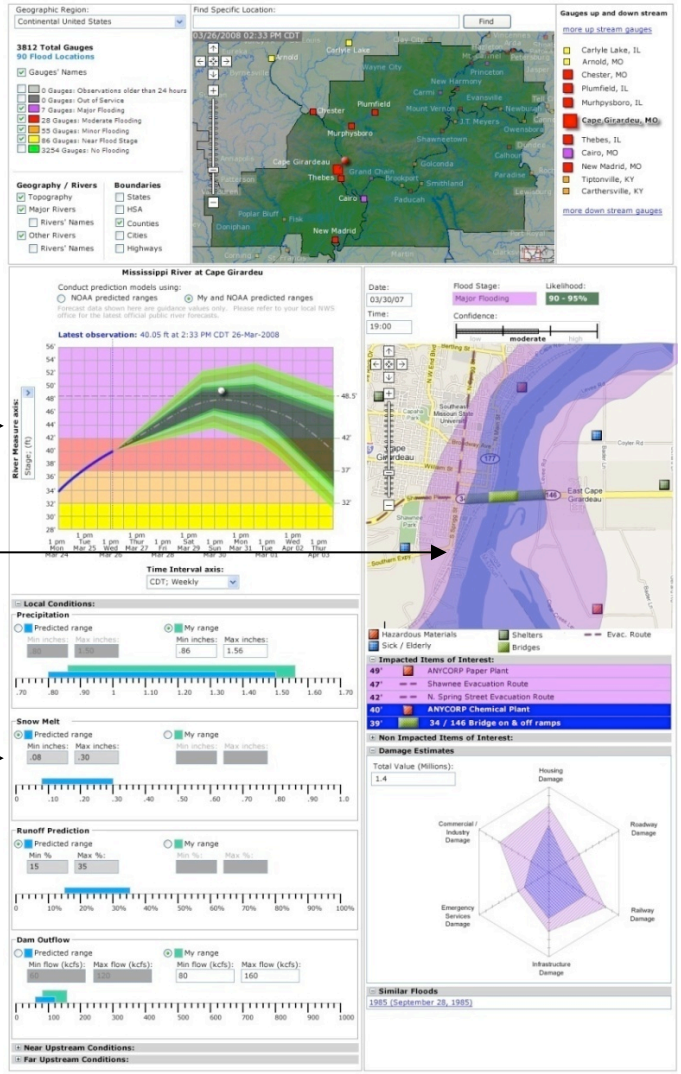
•2010



•2011?

- •Geographical
- •Depiction
- •Probabilistic
- •Inundation
- •Mapping
- •User Tools
- •*Aptima*

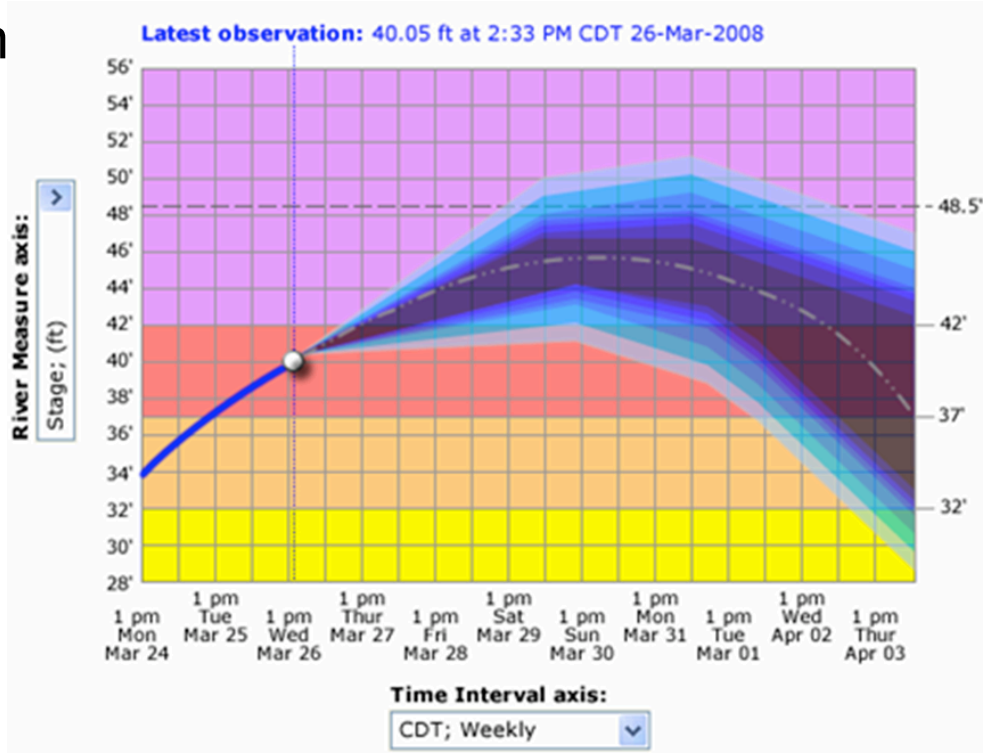


Advanced Hydrologic Prediction Service

Probabilistic information to support risk-based decisions

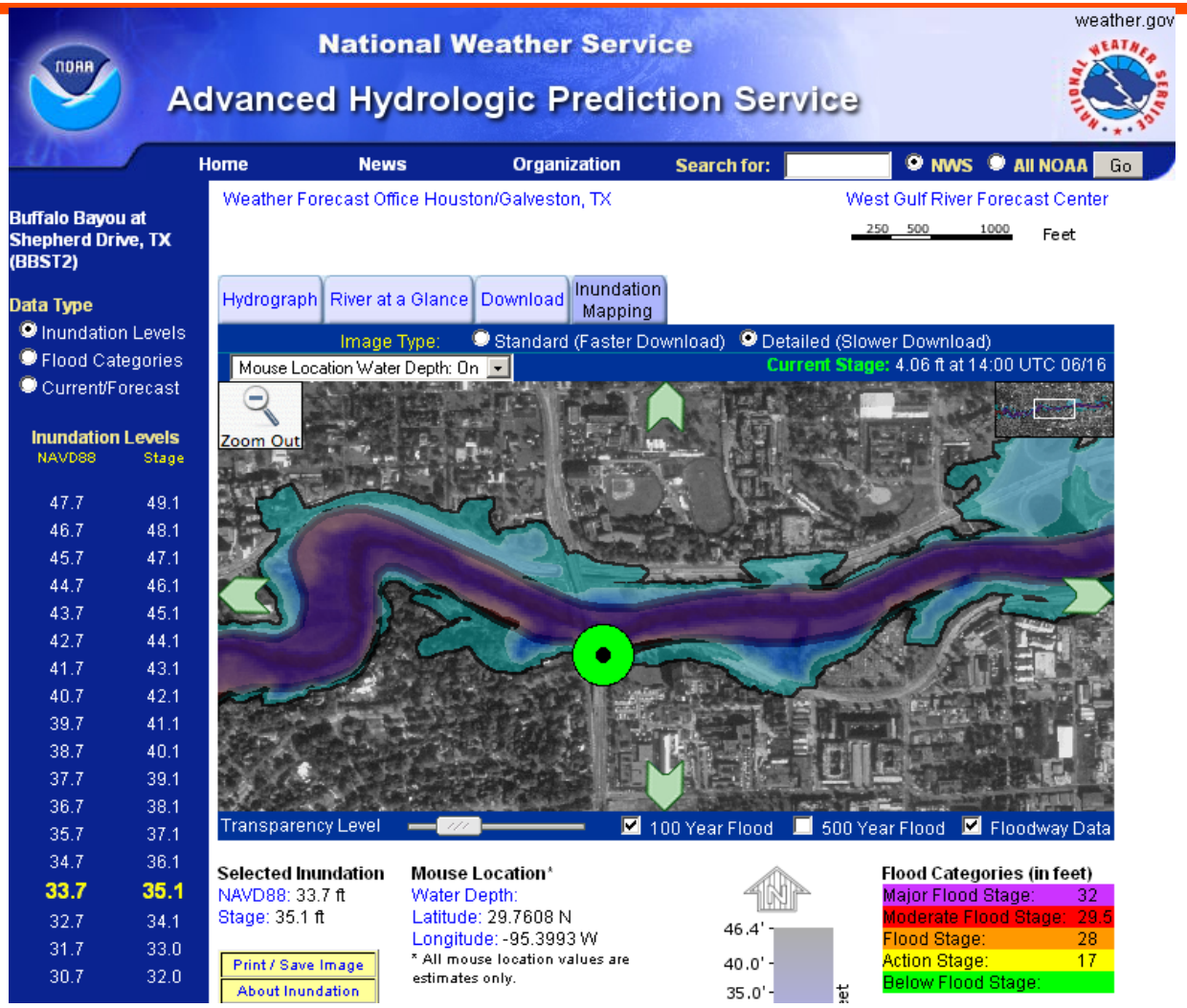
- Seamless short- to long-term
- Hydrologic Ensemble
- Forecast Service

- Incorporates both atmospheric and hydrologic uncertainties



NOAA NWS Flood Inundation Mapping

- User Tools tied to NWS river forecast locations
- Depicts flooding from minor to historical levels
- Communities can see potential impacts to the flood-prone areas
- NOAA is working with FEMA, USGS, and USACE to communicate Flood Risks



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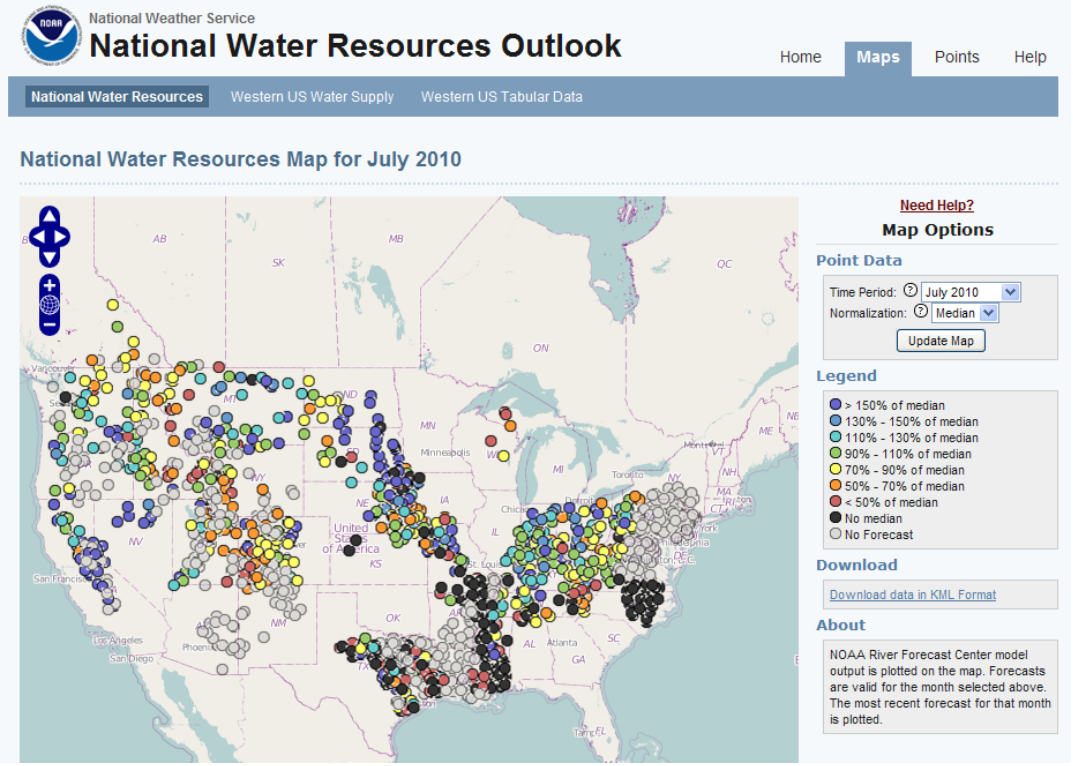
National Water Resources Outlook

- Seasonal Water Supply
- Verification
- Data Archives
- Probabilistic Forecasts
- Climate Variability
- Consistency across Country



- Support National Drought Activities

- Supports the Strategic Plans of NOAA and the NWS
- Related to Water Resources

Water Resources Vision 2020

Deliver a broader suite of improved water services to support management of the Nation's Water Supply

Provide resources and training to:

- *Enable River Forecast Centers to run high-resolution models and **produce gridded forecasts of streamflow, salinity, and soil moisture***
- *Expand role of the Weather Forecast Offices to help local decision makers to use enhanced water forecasts, and function as **decision-support experts for high-impact flood, drought, and water quality events***